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Queer Mineralogy and the Depths of Hell: Sulfuric Skills, Early Modern England, and the North American Frontier

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Article abstract

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DR. ANDREW KETTLER

Abstract

Levels of environmental apprehension are determined by how threatening embodied sensations deem ecological hazards. This may seem a simple categorization regarding human choice to participate in environmental activism. However, as energy conglomerates work to hide their malfeasance, modern selves rarely experience environmental decline through the five senses. The distances between the modern self and ecological hazards, both physical and discursive, emerge because the superstructure develops defense mechanisms that protect polluters. Encountering sulfur in the English environment, prior to the Industrial Revolution, consistently meant that evil was moving within the preternatural realm. The external sensing of evil through the sensory signatures of sulfur was a form of sense work within the phenomenological space between the supernatural and the natural. Throughout the Early Modern Era, the idea that sensing sulfur signified evil or malevolence faded. Because coal and her sulfuric sensory traits became vital to the establishment of the Industrial Revolution, embodied changes were forced to occur, essentially through the creation of a false sensory consciousness that defined sulfuric sensations as positive markers of progress, profit, and purity. Upon the frontiers of the commonwealth and the newly established United States, these sensations persisted. The early frontiers of North America offer historical spaces where individuals marched westward and educated their senses to discover profit. Sulfuric connotations of evil were rarely considered, as frontiersmen educated their senses beneath a superstructure that defined associations with sulfur as preternaturally safe. Sensory skills were negotiated and educated to catch coal and sulfur through greater and more refined tactile, nasal, flavorful, visual, and aural skills. These sensory pedagogies inhabited somatic work farther west into British Columbia, known for explosive environmental conditions due to large coal supplies, indigenous populations, sacred alimentary goods, and amazing natural beauty. How citizens decide to become activated to environmental concern, as within modern Vancouver and her sulfur mounds, arises through whether the socially constructed senses ever perceive pollution as corruptive.

Résumé

Les niveaux d'appréhension environnementale sont déterminés par la façon dont les sensations menaçantes personnifiées discernent les dangers écologiques. Cela peut sembler être une simple catégorisation concernant le choix humain de participer à l'activisme environnemental. Cependant, alors que les conglomérats énergétiques s'efforcent de dissimuler leurs méfaits, le soi moderne vit rarement le déclin environnemental par le biais des cinq sens. Les distances entre le soi moderne et les dangers écologiques, tant physiques que discursifs, surviennent parce que la superstructure développe des mécanismes de défense qui protègent les pollueurs. La présence du soufre dans l'environnement anglais avant la révolution industrielle, signifiat toujours que le mal se déplaçait dans le domaine du préternaturel. La perception externe du mal par le biais de traces sensorielles du soufre était une forme de labeur sensoriel dans l'espace phénoménologique entre le supernaturel et le naturel. La notion que la détection du soufre signifiait le mal ou la malveillance s'est évanouie au début de l'ère moderne. Parce que le charbon et ses caractéristiques sensorielles sulfuriques sont devenus essentiels à l'établissement de la révolution industrielle, des changements personnifiés ont été contraints de se produire, essentiellement par la création d'une fausse conscience sensorielle qui définissait les sensations sulfuriques comme étant des marqueurs positifs de progrès, de profit et de pureté. Aux frontières du Commonwealth et des États-Unis nouvellement établis, ces sensations ont persisté. Les premières frontières de l'Amérique du Nord offrent des espaces historiques où les individus se sont déplacés vers l'ouest et ont cultivé leurs sens pour découvrir le profit. Les connotations sulfureuses du mal étaient rarement prises en compte, car les pionniers instruisaient leurs sens sous une superstructure qui définissait les associations avec le soufre comme étant prénaturellement sûres. Les compétences sensorielles étaient négociées et formées pour capter le charbon et le soufre grâce à des compétences tactiles, nasales, gustatives, visuelles et auditives plus importantes et plus raffinées. Ces pédagogies sensorielles ont habité le travail somatique plus à l'ouest, en Colombie-Britannique, connue pour ses conditions environnementales explosives dues aux grandes réserves de charbon, aux populations indigènes, aux produits alimentaires sacrés et à l'étonnante beauté naturelle. La façon dont les citoyens décident d'agir à la préoccupation environnementale, comme dans la ville moderne de Vancouver et ses monticules de soufre, dépend de la perception de la pollution par les sens socialement construits.

Within Michel Foucault's lectures regarding the genealogy of the modern subject, on the *Hermeneutics of the Self* (1980), the reader is introduced to the introspective character of Serapion, a young monk living in third century Antioch. Relayed from the tales of later religious chronicler, John Cassian, Foucault provides the story of Serapion to appreciate "self-technology" in the making of the modern subject.[1] In order to show the emerging self through confession as a newly constructed form of introspection for early Christians, the French theorist offered a story in which the young monk, unable to live through a difficult fast, had started to steal bread. These thefts were exposed through oral confession and the removal of stolen food from beneath Serapion's concealing robes. Through these acts, Serapion marked his identity via spoken release that asserted the truthful subject that overcomes misguided thoughts. For those near Serapion, his selfhood was defined through a different release, as an uncanny smell of sulfur filled their noses.[2]

The subject, within these Western traditions defined by a self that speaks truth to mark individuality, is also often defined through changes in sensory worlds that relate to body/object relationships between the self and the other. For those near the young monk in early Antioch, the exposure of evil through the smell of sulfuric brimstone signified hell, either escaping the purified body recently confessed or marking the still and permanent evil within all persons. The experience of smelling Serapion, himself an object that emitted the significations of evil, involved others cultivating sensory skills to perceive the preternatural.[3]

As this theoretical vignette portrays, sensory skills occasionally come from the individual, who can often train their senses for different behaviors. However, nearly all sensory skills are also informed, altered, and constructed within hegemonic cultural discourses.[4] As Mary Douglas outlined, and the anthropology of the senses further articulated, the body can be educated to understand certain things as either pollutant or pure.[5] As part of these discourses, modern consumers are told what smells aromatic, what tastes delicious, and what feels desirable.[6] As with the self-technologies developed by early Christians, modern subjects may be able to world-form in dialogue with the controlling aspects of sensory education emplaced upon the body, but modern populations can never fully escape the effects of the superstructure upon the sensorium.[7]

Within forms of sensory education, transitions between energy regimes have frequently involved making bodies able to subsist both

biologically and culturally next to corruptive materials. These conversions between energy regimes, as with the consequential biomass to coal transition of the Industrial Revolution, are frequently culturally debated.[8] However, rarely do these discussions engage how values are informed by discursive alterations upon the body.[9] When Alfred Crosby called the human desire for increased energy an "appetite" in the subtitle to his essential *Children of the Sun* (2006), he articulated that the impetus to move faster, power more, and burn harder was a constructed ideal that not only placed more carbon into environments, but also altered sensory worlds to want more energy through human appetites.[10] The unending frontier of scraping, digging, and fracking the earth for more energy continues to be shaped by how disgusting or pleasing the objects of energy are deemed, and how well humanity is able to sense the risk or rewards of those minerals upon the body politic.[11]

Through similar patterns that create abstract value through the fetish, as part of a libidinal economy of sensory associations that alter embodied experience, the superstructure also alters sensory associations of the body to not sense that which might threaten economic relationships.[12] Within this process of sensory agnotology, humans are consistently concealed away from nature, partly through discourses that alter the function of embodied sensation.[13] In general, encountering sulfur in the environment, prior to the Industrial Revolution that accelerated into form during the late eighteenth century, had consistently meant that evil was moving within the preternatural realm. The external sensing of evil through the sensory signatures of sulfur was a form of sense work within the space between the natural and the supernatural. As this article asserts, throughout the early modern era from the sixteenth to the nineteenth century, the idea that sensing sulfur signified evil or malevolence faded. Because sulfuric sensory traits were a mounting consequence from the "mineral energy economy" of the coal-fired Industrial Revolution, embodied changes were forced to occur, essentially through the creation of a new and false sensory consciousness that defined sulfuric sensations as positive markers of progress.[14] After the eighteenth century, sulfur became a prized commodity for European and New World nations attempting to create cartels to control the trade of the product. The use of sulfur within gunpowder, as a signifier for coal supplies, and as part of agricultural recipes for fertilizer, made the substance essential to state consolidation, market development, and military defense.[15]

Upon the frontiers of the commonwealth and the newly established United States of America, these sensory changes continued. The early borderlands of transnational North America also offer historical spaces where individuals marched westward and educated their senses to discover profit.[16] Sulfuric connotations of evil were rarely considered, as frontiersmen educated their senses within a new market culture that defined the associations of sulfur as preternaturally safe. Sensory skills were negotiated and educated to catch coal and sulfur through more refined tactile, nasal, tasteful, visual, and aural skills. These sensory pedagogies inhabited somatic work farther west into British Columbia, Canada, known by voyagers for an explosive environmental mixture involving an "organic machine" of abundant coal supplies, resistant Indigenous populations, sacred alimentary goods, and amazing natural beauty.[17]

Today, in the rapidly expanding city of Vancouver, British Columbia, large sulfur mounds are often hidden from the senses. Similar to steel production, plastic manufacturing, cattle ranching, and the refining of oil, the threat to the environment posed by sulfur is rarely sensed.[18] In order to re-engage the human senses to appreciate the agency of nature, it will become important to follow the recently crafted tenants of queer mineralogy, whereby having affective sensory relationships with minerals that include their own natural and unalienated agency can engage the body politic towards greater respect for the damage being done to the planet. Such attention to the agency of the geological can help to overcome previous cultural constructions of sulfur as signifier of either evil or profit, as object-oriented ecocriticism can help to educate broader populations how to engage rocks through their own destructive or affective potential.[19]

Sulfuric Witches and the Devil's Element

During the early modern era, fresh distributions of the senses created a general English consciousness that increasingly accepted violent sensations of sulfur, even as the yellow metal poisoned lungs and tortured nasal passages with the stink of previously evil connotations. As the labour of the later Industrial Revolution stuffed chimneys with coal and sulfur smoke, the smell and crackle of brimstone became less problematic for English populations. Increasingly taught that sulfur meant profit and progress, English bodies progressively found less sin in acrid sulfuric smoke. As Stephen Mosley has noted of these

industrializing eras of the nineteenth century: "unlike the foul odours associated with miasmas," coal smoke "did not fill the Victorian city dweller with apprehension. Indeed, many people actively embraced the idea that this form of air pollution deodorized and disinfected the urban atmosphere."[20]

Prior to the rise of the Reformation and the Scientific Revolution, which both accelerated throughout the seventeenth century, sulfur typically meant evil manifesting on earth.[21] The material of sulfur was meaningful prior to the eighteenth century as a signifier for witches, demons, and malevolent persons.[22] During the seventeenth century, the growing market for coal-fired products and the needs of the military increasingly required sulfur to be considered a positive as the product was necessary for iron smelting and filling the rifles of the modernizing army.[23] As such, a discursive and uncanny proportional manipulation began, whereby sulfuric signatures moved from being considered a contaminant that emitted the signs of hell, to a fetish that often signified cleanliness through fumigation and an important byproduct of energy production that meant England was leading the capitalist reordering of the world.

Numerous sulfuric signatures implied negative environmental associations to evil during the sixteenth and seventeenth centuries. Witchcraft was often signified by the odor of sulfur, or by the taste of sulfur in the air near a demonic possession, as in numerous cases in the collected *Saducismus Triumphatus* (1681).[24] Many legal works, like Reginald Scot's *The Discoverie of Witchcraft* (1584) and John Cotta's *The Infallible True and Assured Witch* (1625), guided practitioners on how to catch witches, specifically involving the use of the nose to sense sulfur upon the witch's body.[25] Throughout the seventeenth century, the associations between witchcraft and sulfuric sensing declined as part of a disenchantment process that involved urbanization, the Reformation, and the rise of scientific investigations into witchcraft.[26] During the later sixteenth century, as well, English beer manufacturers and iron smelters began to rely on highly sulfuric seacoal to increase their production to meet growing populations. The uses of these materials that included sulfur, which previously offered the smells, tastes, sounds, and burns of hell, were ever more considered through connotations of progress, cleanliness, and profit.[27]

The use of sulfuric materials became increasingly common within three material fields of power as the early modern era progressed within England: as part of the gunpowder army, within the

market for coal burning, and as essential for early modern medicine.[28] As Will Cavert has recently shown, the importance of coal for the rise of English modernity was debated during the first blasts of industry during the seventeenth century. This article moves those socioreligious debates on the environment to a diachronic analysis of proportional shifts, whereby ecological meanings can be un-made as a result of economic incentives that reorganize beliefs about religious or ecological threats.[29]

As evidence of this proportional shift in cultural education away from religious connotations of sulfur as signifying evil on earth, early associations for gunpowder that had often included discussions of hellish properties of sulfur within ammunition were increasingly mislaid. For instance, the English deacon and religious chronicler, Edward Kellett, noted ironically in *The Threefold Supper of Christ* (1641) that European ammunitions using gunpowder included elements that English religious writers had sometimes defined as hellish. He questioned, "Who would have thought, that the River-water should be the chief ingredient to make Gunpowder?" Such "River-water" was the lava-laden liquid that exited hell from the River Styx as guarded by the god Charon, the ferryman to Hades. Kellett venerated the inventors of gunpowder, rather than judge them immoral for their use of hellish elements. He offered that England's "brackish fountains; our Baths; our Brimstony springs, or rivulets, may perhaps" provide content for English armories.[30]

Equipping large state militaries with gunpowder implicitly forced the gradual removal of the devil from associations to the scents of sulfur. These earlier undertones regarding the evils of sulfuric ammunition had been regularly designated to a demonically inspired German Friar named Bartold Schwarz.[31] However, as the early modern era progressed, gunpowder became essential for English state defense.[32] The idea that gunpowder was from the devil entered the realm of the relatively unspeakable, or at least the realm of the mocking. For illustration, a pamphlet providing news of the explosion of Great Torrington Church during the English Civil War included a metaphor to hell based on the scents of sulfur caused by the explosion. The print, *A Fuller Relation of Sir Thomas Fairfax's Routing All the Kings Armies in the West* (1646), summarized how the Parliamentarians defeated the Cavaliers through artillery that destroyed "the walls of the Church," after which "all fell and dispersed abroad … the Timber, glasse, stone work, lead, are all lost being dispersed and torn in

pieces … like the shot of Granadoes: We feared a treachery … Hell itself could not make a more hideous sulpher."[33] The devil could not make as "hideous" a sulfur as the New Model Army, especially after a discursive shift away from religious definitions of sulfur's odor limited fearing pungent brimstone as inherently satanic.

Coal burning also grew throughout the early modern era from a previous minimal base that applied sea-coal collected from the shores of the British Isles to a vast enterprise involving new property rights and inventions that improved access to underground mines. During the seventeenth century, Englishpersons began to experiment with the use of cloud inducing coal to heat homes, especially within the growing metropolis of London. The diarist and monarchist John Evelyn thus wrote of the Restoration Era capitol city in *Fumifugium* (1661) as full of a "deleterious quality" that floated in "clouds of smoake and sulphur, so full of stink and darkness."[34] Implicit in such a reference were metaphorical ties to the darkness and pungency of hell, but no longer a hell manifesting itself in the world explicitly through the specific sulfuric coal which choked city dwellers, blackened miners' lungs, and saddled workers with hefty sacks of trenchant rock.

The new propensity of using coal to create wealth led to surveys of the potential to find and use different forms of the rock throughout the landscape. In Gabriel Plattes' guidebook, *Discovery of Subterranean Treasure* (1679), English and later Anglo-Atlantic searchers were taught how to use their senses to discover diverse seams of coal, both bitumen and anthracite. For Plattes, whose work was often republished in later editions, levels of brimstone odor often marked the difference between specific rocks being encountered within the environment.[35]

Partly because of the rise in the importance of gunpowder, coal markets, and healthful cleansing as a medical fumigant, sulfur became less troublesome to British populations who encountered the devil's element on the battlefield, upon urban streets, and within coal mines. In the poem entitled *Scrub, Scrub* (1707), possibly penned by Samuel Bunchley, the use of sulfur as a cleansing product was portrayed as more valuable than concerns with the devil's presence within olfactory miasma: "O *Brimstone*! There are very few/ Have sung what to Thy Praise is due:/ What noble qualities there are/ In *Thee*, of whom some stand in fear." Whether for clearing lungs, providing light in the dark, bleaching silk or linen, or even helping with pregnancies, sulfur was understood as much too important to be consider malevolent. Thus, sulfur had more "Strength than *Evil*,/ To Singe an Immaterial *Devil*."[36]

Due in part to connotational shifts in the fields of defense, science, and medicine, coal mining burgeoned, driving the brick kilns of beer manufacturing into larger beehive ovens, puddling techniques, and the grander furnaces of pig iron smelting advanced by Henry Cort, Dud Dudley, and Abraham Darby. These technological advances continued into the later eighteenth century through coke-burning blast ovens built for the steel mills of the ever-expanding Industrial Revolution and the coal-fired weapon designs of John Wilkinson.[37] By the nineteenth century, a vast proportional shift had altered most British references to sulfur, leading to debates on its profitable and scientific aspects that included markedly fewer references to hellish sensations.[38]

Sensory Skills on the Borderlands

The growing value of sulfur for the general welfare of the economy and the state did not fit the sacred metaphors used to define a sulfuric devil disembarking his sycophantic allies. As such, transnational concerns with sensation that were based in Anglo-American cultural traditions shifted from an interest in sensing evil within the world to applying the senses, as cultivatable and educated skills, to search out greater areas for sulfuric profit. On the North American frontier, increasingly devoid of supernatural significations, sensory skills were applied not to sense the devil or his minions, but to engage a new and profound search for minerals.[39] As frontiersmen pushed west, invading Indigenous territories while they defined themselves against the landscape, they taught each other how to root out sulfur and coal as both a threat to water supplies and as a generator for proceeds.[40]

Coal was important to British travelers in colonial western North America. Negotiator George Croghan's discussion of coal reserves near the Ouabache River, now the Wabash River of Indiana and Ohio, in 1765 provided that the French had been disguising the coal and mineral wealth of the frontier.[41] Smelling and sensing sulfuric regions was a common aspect of later western ventures into contested areas. In his explorations from 1807 to 1809, the English travel writer Fortescue Cuming noted how many in early America would travel from the Potomac to the sulfur springs of western Pennsylvania searching for the healing powers of the waters near salt mines, which were "impregnated with sulphur, and smell and taste exactly like the bilge water in a ship's hold, of course they are very nauseous."[42] Cuming wrote often of coal in these regions, so abundant and burned to the extent of dirtying

homes with the atmospheric content of charred rock. The profusion of coal created low costs for the energy that supplied burgeoning industries in the region, including glass blowing, salt production, and the timber trade, less burdened to supply lumber for charcoal.[43]

As Cuming's summary notes, the amount of sulfur in water supplies for western travellers was of much concern. Many explorers learned to sense sulfur through seeing coal near water supplies. Others, more scientifically inclined, used a process whereby a piece of silver would be placed in a solution, turning black if the water contained amounts of sulfuric content that could be dangerous to dry throats and needful stomachs.[44] For Scottish naturalist and explorer John Bradbury, the choice of settlers' homes in areas near St. Louis and throughout what would become the American Midwest also often depended on sensing proximity to coal, as colonizers and travellers understood not only the value of coal for domestic fuel, but also that coal would become important for foreign markets with which the United States wished to engage during the early years of the nineteenth century.[45]

For many of these western voyagers, the properties of coal could be detected through diverse sensory skills that emerged from Anglo-Atlantic cultural education regarding attractive environmental signifiers of rocks for profit. Often, in areas where coal was in great abundance near the topsoil, fires would combust from the land and burn for months and years. The summaries of H.M. Breckenridge's travels near the Missouri River in 1811 described how he came to define the pumice stones near his encampment as coal, by devising tests to determine whether the rocks would float when broken off from the burning banks of the river. Breckenridge, a young lawyer, also often analyzed the coal banks of the Missouri River using touch to break down rocks to discern mineral components that frequently included sulfates within the black coal.[46]

These *ad hoc* sensory tests of tactility and visual acuity marked how frontiersmen understood their place in a burgeoning economic system that would increasingly be defined by coal. Over time, searchers came to understand specific visual skills that also had to be learned in order to quickly locate the finest coal seams. Often, this search would involve finding the vise of a coal inhabited landscape. In Scottish writer James Flint's *Letters from America* (1818–1820), the area near Stoystown, Pennsylvania, was noticed to be particularly representative of this coal vise, whereby changes in the rock

bedding were visibly "perceptible" to the knowledgeable traveller.[47] The vise of coal had been important for searching out coal mines in Britain, whereby this "trace…points out to the skillful eye which way the metals are thrown out from their former course or level."[48] Many explorers also often used their sense of taste to discover the polluted waters near salt licks that would be frequented by their accompanying animals. Tasting for sulfur often provided many wayward voyagers with sensory knowledge that water near "salt licks" was too polluted for their animal assistants and their own basic needs on scarce borderlands.[49]

English botanist Thomas Nuttall's accounts included the importance of encountering a coal mining camp near Laurel Hill, Pennsylvania, which was confronted as the retinue entered a valley and noticed the strong "sulpherous smell" of the many coal bushels that sat ready for shipment.[50] Near Pittsburgh, such subtle use of smelling was rather unnecessary for discovering coal, which consistently burned by the city, resembling "a volcano" according to the British chronicler, William Faux, in January of 1820. As explorers and observers made their way west, these volcanoes to the eyes and sulfuric scents to the nose did not mean the emergence of a new hell in the American milieu. Increasingly, they meant that God had blessed the land with profitable providence.[51]

As travellers searched for lucrative coal, they used their eyes, fingers, tongues, ears, and noses to discover the possibilities of mineral wealth. In Nuttall's travels, coal was searched out in different regions near the Arkansas River. In proximity to the voyagers, the stinking "fetid bubbles" and "slight scum of Sulphur" of a spring signified to the learned travellers that coal might be burning nearby. The lack of plants near the brook, the scents of sulfur, and the sight of nearby stones that were known to accompany coal seams, as with the more darkened colour of "slaty sand stone" near Webber's Falls in Oklahoma Territory, all signaled the sensory signatures of beneficial energy supplies. To define the purity of coal during his travels to discover the resources of the new nation, Nuttall would also often use his tongue and nose. Near Chickasaw Bluff in Memphis, Tennessee, his travels led to a seam of coal that he considered "wood-coal" that contained "less bitumen than usual" because it was "sensibly acid" to the taste and "smelt in burning like turf." The amount of "turf" smell and the level of "smoke" or "blaze" created when burning signified to Nuttall the levels of purity within specific coal and charcoal supplies.[52]

Always near Native American nations within the American West, S.H. Long's engineering expedition of 1819-1820 on behalf of the American government also noticed that the "smell of sulphur" signified a "very perceptible" coal region located near the ancient mounds of Cahokia. For some Native Americans in the region, the sulfurous waters that bubbled near Grand Tower on the Mississippi River exhibited evil *manitou* that circled the river into what previous inhabitants considered a demonic whirlpool, lending themselves to the region's name, the "Devil's Oven."[53] For Long, "brine pits" near certain mineral-rich regions encountered during his travels also signified the depth and size of a coal seam. The "sensible properties" of the gases and the "bituminous oil" in the waters near certain types of sandstone signified, even without coal at the surface, that many seams were just below the land, ready to be mined.[54]

Long's entourage consistently searched out these sensory signs for the "same indications of fossil coal." Previous inhabitants of coal-rich areas in the Ozarks had often feared the smells of evil and the "luminous" low-lying skies that rose above naturally-burning coal beds. Long relayed one story of a burning prairie that was visited by two itinerant preachers who noticed their whips, horses, and clothes began to take on flames due to the heat of the ground at Loutre Lick, in modern Missouri. As Long and his men searched out these formerly evil signatures on the landscape, the men of science knew that their sensing of sulfur meant progress rather than malevolence. Although many references to the evil's scent remained within different religious contexts, as with some fearfulness of sulfuric odours from these faithful settlers and for others in the wake of the New Madrid earthquake of 1811, proportional shifts in the public sphere had generally moved to attribute greater force to the search for the progressive and positive market signatures of coal.[55]

Pushing further west into the Ozarks and the Rockies, adventurers would pay consistent attention to the colour of mountainsides to determine the wealth of coal seams. As Long observed, the reddish sandstone signifying coal on the eastern Ozarks faded into greater and darker coal seams as the western Ozarks declined again into plains. Long offered a pedagogy to his readers regarding the "distinct stratum" of rocks near different coal seams based on these western encounters, especially concerning the abundant areas of coal in Pennsylvania, Maryland, and New York, specifically highlighting the colour of stones near bituminous deposits as opposed to deposits of more effi-

ciently burning anthracite. For Long, the potency of coal types could be determined by nearby rocks, often provided by the pyrite, sulfur, and lead contents within stones that ranged from "blueish, black, or dark brown … [and] green," to "bright red."[56]

The "highly picturesque" appearance of these many colours of stone near coal deposits was also consistently relayed by Prince Maximillian of Wied in his travels near the caves and caverns of Fort Clarke and Mandan settlements on the Upper Missouri in the fall of 1833.[57] For Maximillian, the "strong sulpherous smell" of specifically bituminous coal deposits near these midwestern locations signified that the coal in the region was insufficient to burn hot enough to power a forge. Extreme blackness, quickness of ignition, and risky sulfuric odors increasingly signified to travellers that the coal they had discovered was not of the finest quality.[58] These focused sensory skills used to find coal and protect animals were important for many settlers first encountering the once pristine beauty of the American West.[59]

As travellers moved farther west, coal served as an essential fuel for nightly camping, often lit using gunpowder that included sulfur. In one instance during fur trader Alexander Ross' travels into Oregon Territory from 1810–1813, this lighting process involved an explosion of sulfur, gunpowder, and heated coal that sent a member of the retinue, Jacques, "sprawling six feet from where he stood."[60] Like on the frontiers of the eastern United States, advances into western territories included the consistent attention to the amount of sulfur in nearby waters, as with the case of a well tainted by sulfur within American diplomat Edmund Flagg's journeys of 1836–1837 near Monks Mound, at the ancient Indigenous settlements of Cahokia.[61]

Near the Grand Tetons in modern Wyoming, the travellers in the retinue of Thomas Jefferson Farnham were overcome by the smell of a cavern that "hung with beautifully crystallized sulphur." The sight of the crystals, the smell of the sulfur, and the warmth of nearby springs provided sensory signatures to the cohort that indicated nearby coal supplies.[62] While in what is now modern North Dakota, South Dakota, and Minnesota, Farnham's group learned of the mineral qualities of nearby rocks from tasting the waters of streams that ran down bluffs, often taking knowledge from the Dakota people regarding the purgative nature of waters laced with the sulfur, salts, coppers, and aluminums that filled the streams after hard rains or snow melt. For these Indigenous nations, as Farnham relayed, the burning of coal

was a considerable aspect of Ghost Dance rituals that persisted on the Northern Plains.[63]

Western explorations mixed economic motives with religious inspiration afforded through the ideal of Manifest Destiny emerging from the printings of newspapermen on the eastern seaboard. The open landscape of the west, never actually unoccupied, was increasingly part of a quest to conquer the land in front of Anglo-American bodies and their market-trained senses. On their journey through Blackfoot lands near the eastern base of the Rocky Mountains in 1845-1846, the missionaries of Father Pierre-Jean De Smet questioned the use of the land using these providential terms: "How long shall these superb forests be the haunts of wild beasts? And these inexhaustible quarries, these abundant mines of coal, lead, sulphur, iron, copper, and saltpetre — can it be that they are doomed to remain forever inactive? Not so — the day will come when some labouring hand will give them value: a strong, active, and enterprising people are destined to fill this spacious void."[64]

The exploration of Vancouver Island and the surrounding mountainous region was ripe with similar sensory discussions of coal and providence. Farnham noted the importance of coal to discoveries near Puget Sound, searched quickly by the Hudson's Bay Company, who initially found the coal of the region to be of an inferior quality. Coal had been exported from the area as early as 1854, and increased shipments sprang out of Seattle coal shafts after 1870.[65] The coal industry boomed in early Vancouver due to the accessibility of coal seams in close proximity to the Pacific Ocean. Learned from earlier cultivations of sensory skills throughout North America, Matthew Macfie's travels to the Pacific Northwest offered that the best coal in the region could be detected by sensing a low proportion of sulfur in the rocks.[66]

Charles Edward Barrett-Lennard similarly noted the importance of sensing coal for fuel at campsites, and asserted that voyagers were consistently attuned to analyze the sensory quality of the coal in the region. Barrett-Lennard noted that the "Nanaimo" coal common to the countryside near Vancouver was not of the finest quality but was nonetheless used to power the steam ships of the British Royal Navy.[67] These travellers outlined the importance of mineral reserves to the expansion of the British Empire along the Canadian Frontier. Threats and opportunities were always present on these early limits in British Columbia, and the education of the senses that occurred during the previous century taught settlers and travellers where to look and from

what to run. Their notes paid consistent attention to the market skills learned to analyze sulfuric impurities of coal resources.[68]

Sulfur Mounds and Sensory Agnotology

The diverse experiences of encountering the majestic British Columbian environment created specific mentalities for settlers to the region. Frontiersmen focused their sensory worlds to hunt out coal because consumers needed energy. In present day British Columbia, discourse on sensing the environment has become ever potent. Terms that carry great weight, like "biodiversity" and "conservation," are frequently used as semiotic weapons, whereby knowledge about helping the environment is blurred to such an extent that ecological debate can become stunted.[69]

This article, through understandings of change over vast periods of time, provided how economic value, characterized via abstractions within discourse, can alter perceptions of environmental objects, as the superstructure works to greenwash environmental threats. More simply, proportionally changing perceptions of sulfur over time, from evil to a signifier of profit, exemplifies how economic valuations informed how the Anglo-Atlantic body functioned. These uncanny greenwashing procedures continue to train the senses of the masses to perceive pollution in less threatening manners.[70]

As the journalist Larry Pynn has recently shown, the sulfur mounds of Burrard Inlet, near the City of Vancouver, British Columbia, coexist next to a large and environmentally aware population. These mounds increasingly rise at Pacific Coast Terminals, as sulfur is a natural and important byproduct for the manufacturing of natural gas. More mounds will rise in the coming years, as Pacific Coast Terminals expands to handle new contracts to refine potash into fertilizer that often includes sulfuric components. As of 2016, the Inlet was already contaminated to such a point as to kill shellfish. A race has thus developed between companies hiding their pollutants and ecological activists who want to expose this pollution to the public. The environmental contest between First Nations, the sensoriums of suburban Vancouver, and the energy companies who pile mounds of sulfur, rests on how sensory observations of destructive elements make their way to the broader public sphere.[71]

Coal pollution causes cancer, autism, miscarriages, and poor lung and brain development in children.[72] The poetics of the Anthropocene

are invaded by the powers of capital through greenwashed terms like "clean coal." The advanced technology of modern smokestacks collect sulfur from burnt fossil fuels, turning the product into fertilizers and components used for the extraction of phosphates. Still, coal burning continues to change the climate, heating the atmosphere to record levels, warming the oceans, killing bodies, and melting ice caps. Because of discourses on health and energy, power-providing conglomerates search for ways to hide the sensory signatures of pollutants like sulfur.[73] These sensuous misrepresentations within discourse increasingly provide and construct a failure to sense as an important part of existing within the polluted body politic. As our senses are manipulated within accelerating cultures to not sense minerals in their truthful existence, humans are denied honest relationships with the earth's own agency, because authentic relationships with the terrain will allow the greater population to sense environmental harm and consequently critique the economic base that supports the vitalities of capitalism.[74] As Kathryn Yusoff has argued regarding relationships with minerals as essential for understanding the Anthropocene, "the geosocial formations of fossil fuels constitute the very possibilities for certain types of social, sexual, political, and labour arrangements."[75]

Queer mineralogy specifically offers that scholars in the Anthropocene should provide narratives regarding the importance of human relationships to geological materials as a pathway to understanding ecological hazards through the senses. To understand the agency of objects, queer mineralogy links speculative realism to geology and forms of political resistance. Finding connections to the material agency that rocks produce allows for more correctly understood affective relationships with the natural environment, one less invaded by the fetish, profit motive, and energy discourse within the superstructure. Moving beyond the biocentric subject of Western modernity, to a realism that finds knowledge produced from the geological object, would assist with bypassing the alienating fetish that asserts different energy regimes as proper when they are pollutant.[76]

Hsuan Hsu has also summarized that scholars must pay "attention to the daily transformations of body and mind experienced most intensely by vulnerable communities inhabiting modernity's uneven geographies of risk."[77] Coal and sulfur pollution are increasingly silent, making environmental policy changes even more difficult as energy companies hide their pollution materially and discursively.[78] Understanding that dialogues on minerals, senses, affect, and pollution can

shift the very experiences of our bodies necessitates that those with a critical eye towards environmental activism can engage polluting minerals in order to not forget, to avoid the sensory agnotology that is caused by greenwashed forms of disinformation within environmental discourse.[79] The current environmental moment can better attend to the earth, even queerly through attention to the non-living, to allow for a more encompassed view of the damage being inflicted by unsympathetic polluters. In order to persist within an Anthropocene that is increasingly polluted, hot, and plastic, society can remind itself what sulfur is — a corruption to the body politic — rather than accept sensory education that denies exacting sensations of sulfur upon the body.[80]

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